IN-22-CR

NASA CONTRACTOR REPORT 177417

Integrated Voice and Visual Systems Research Topics

(NASA-CR-177417) INTEGRATED VOICE AND VISUAL SYSTEMS RESEARCH TOPICS (Psycho-Linguistic Research Associates) 6 p
Avail: NTIS HC A02/MF A01 CSCL 17B

N88-12246

Unclas
G3/53 0022048

D. H. Williams
C. A. Simpson
Psycho-Linguistic Research Associates
Menlo Park, California

CONTRACT NAS2- 11341

June 1986

NASA

NASA CONTRACTOR REPORT 177417

Integrated Voice and Visual Systems Research Topics

D. H. Williams
C. A. Simpson
Psycho-Linguistic Research Associates
Menlo Park, California

Prepared for
Ames Research Center
under Contract NAS2-11341
June 1986

National Aeronautics and
Space Administration

Ames Research Center
Moffett Field, California 94035

INTEGRATED VOICE AND VISUAL SYSTEMS RESEARCH TOPICS

Douglas H. Williams and Carol A. Simpson

Psycho-Linguistic Research Associates

ABSTRACT

A series of studies were performed to investigate factors of helicopter speech and visual system design and measure the effects of these factors on human performance, both for pilots and non-pilots. The findings and conclusions of these studies were applied by the U.S. Army to the design of the Army's next generation threat warning system for helicopters and to the linguistic functional requirements for a joint Army/NASA flightworthy, experimental speech generation and recognition system.

INTEGRATED VOICE AND VISUAL SYSTEMS RESEARCH TOPICS

Douglas H. Williams and Carol A. Simpson
Psycho-Linguistic Research Associates

During the period of performance for Contract NAS2-11341, Psycho-Linguistic Research Associates (PLRA) performed a series of studies in support of the contract tasks to investigate factors of helicopter speech and visual system design and measure the effects of these factors on human performance, both for pilots and non-pilots. The findings and conclusions of these studies were applied by the U.S. Army to the design of the Army's next generation threat warning system for helicopters and to the linguistic functional requirements for a joint Army/NASA flightworthy, experimental speech generation and recognition system.

These studies have all been reported at appropriate human factors and aerospace technical conferences and published in the proceedings of these conferences in an effort to share the results of the NASA funded research with the academic and industry research community as soon as possible. A list of titles with full references is given.

LIST OF PUBLISHED REPORTS

Huff, Edward M., Voorhees, James W., Simpson, Carol A., Williams, Douglas W., and Bucher, Nancy M. Voice Interactive electronic Warning System (VIEWS). Final Report, prepared for Office of Project Manager, Aircraft Survivability Equipment, U.S. Army Aviation Research and Development Command, 4300 Goodfellow Blvd., St. Louis, MO 63120, 1983.

Remington, Roger, and Williams, Douglas H. A chronometric study of visual display symbology. Proceedings of the 6th Digital Avionics Systems Conference. IEEE/AIAA, Baltimore, MD, December 3, 1984.

Simpson, Carol A., and Navarro, Teresa Pilot preferences, intelligibility, and learnability of two types of computer generated speech. Paper presented at the 107the Meeting of the Acoustical Society of America, Norfolk, VA, May, 1984.

Simpson, Carol A. and Navarro, Teresa Intelligibility of computer generated speech as a function of multiple factors. Proceedings of the National Aerospace and Electronics Conference (84CH1984-7 NAECON). (pp. 932-940), New York: IEEE, 1984.

Simpson, Carol A. and Marchionda-Frost, Kristine, Synthesized speech rate and pitch effects on intelligibility of warning messages for

pilots. Human Factors 26 (5), 509-517, 1984.

Simpson, Carol A., Marchionda-Frost, Kristine, and Navarro, Teresa, Comparison of voice types for helicopter voice warning systems (SAE Technical Paper Series 841611). Proceedings of the Third Aerospace Behavioral Engineering Technical Conference, 1984 SAE Aerospace Congress and Exposition (pp. 217-224). Warrendale, PA: SAE, 1984.

Simpson, Carol A. , Speech variability effects on recognition accuracy associated with concurrent task performance by pilots. Proceedings of the Third Symposium on Aviation Psychology (pp. 87-102). Department of Aviation, Ohio State University, Columbus, OH, 1985.

Simpson, Carol A., Pilot speech performance while talking to a speech recognizer and flying a competitive helicopter pursuit task. (SAE Technical Paper Series No. 851779). Paper presented at the Fourth Aerospace Behavioral Engineering Technical Conference, 1985 SAE Aerospace Congress and Exposition, Oct. 14-17, 1985. Warrendale, PA: SAE, 1985.

Simpson, Carol A., Selecting cockpit functions for speech I/O technology. Proceedings of the National Electronics and Aerospace Congress (NAECON). Dayton, OH, May 20-23, 1985. (pp. 932-940) New York: IEEE, 1985.

Simpson, Carol A. and Navarro, Teresa, Comparison of synthesized and human speech characteristics using Semantic Differential scales. Proceedings of the Voice I/O Systems Applications Conference '85, American Voice I/O Society (AVIOS): Palo Alto, CA, 1985.

Voorhees, James W., Bucher, Nancy M., Huff, Edward M, Simpson, Carol A., and Williams, Douglas H., Voice interactive electronic warning system (VIEWS). Proceedings of the IEEE/AIAA 5th Digital Avionics Systems Conference (83CH1839-0) (pp. 3.5.1-3.5.8). New York: IEEE, 1983.

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
NASA CR-177417		

4. Title and Subtitle	5. Report Date
INTEGRATED VOICE AND VISUAL RESEARCH TOPICS	June 1986
	6. Performing Organization Code

7. Author(s)	8. Performing Organization Report No.
Douglas H. Williams Carol A. Simpson	
	10. Work Unit No.

9. Performing Organization Name and Address	11. Contract or Grant No.
Psycho-Linguistic Research Associates 2055 Sterling Avenue Menlo Park, CA 94025	NAS2-11341
	13. Type of Report and Period Covered
12. Sponsoring Agency Name and Address	Contractor Report
National Aeronautics and Space Administration Washington, DC 20546	14. Sponsoring Agency Code 324-01-16

15. Supplementary Notes

Point of Contact: Technical Monitor, Maj. James W. Voorhees, MS TA-8, Code YH
CSRDO, Ames Research Center, Moffett Field, CA 94035
(415) 694-4024 or FTS 464-4024

16. Abstract

A series of studies were performed to investigate factors of helicopter speech and visual system design and measure the effects of these factors on human performance, both for pilots and non-pilots. The findings and conclusions of these studies were applied by the U.S. Army to the design of the Army's next generation threat warning system for helicopters and to the linguistic functional requirements for a joint Army/NASA flightworthy, experimental speech generation and recognition system.

17. Key Words (Suggested by Author(s))	18. Distribution Statement
Speech Recognition, Speech Synthesis, Speech I/O, Voice I/O, Visual Displays, Integrated Displays, Helicopter Controls and Displays	Unclassified - Unlimited Subject Category 53

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price*
Unclassified	Unclassified	5	

*For sale by the National Technical Information Service, Springfield, Virginia 22161